

supported on the output shaft 23 and the carrier 4, which are coupled unitedly as described above, by means of the upper and lower bearings 41, and it is located at the rotational center of traction drive type reduction gear 20.

[0051] The disc-shaped bottom end 23a of the output shaft 23 has a plurality of (3 in Fig. 5) bores 23b formed equidistantly at the circumference thereof. The head of the support shaft 2a for the intermediate shafts are inserted into the bores 23b, and the bottom ends of the support shafts 2a for the intermediate shafts are fixed to carrier 4 by bolts 32. Between output shaft 23 and carrier 4, a plurality of (3 in Fig. 5) support shafts 2a for the intermediate shafts are equidistantly disposed at the circumference of the externally contacting shaft 5. The intermediate shafts 2 are rotatably supported on the support shaft 2a for the intermediate shafts via bearings 13, and each intermediate shafts 2 externally contacts with the externally contacting shaft 5.

[0052] The outer circumferences of a plurality of intermediate shafts 2 internally contact the internal circumference of the internally contacting cylinder 6.

In the present embodiment, the internally contacting cylinder 6 is fixed to frame 11 via the support member 11a. The output shaft 23 and the carrier 4, which are coupled unitedly as described above, are supported rotatably on the inside of the support member 11a via the upper and lower bearings 42.

[0053] An oil seal 51 is arranged between the externally contacting shaft 5 and the drive motor cover 1b at a position between the spline coupling 26 and the lower bearing 41. Further, the drive motor cover 1b has a recess 1c formed at the radial outside of the oil seal 51 so that storage of abrasion powder generated in traction drive type reduction gear 20 is formed. Reference numeral 52 denotes a bolt which can be engaged and disengaged, and when the bolt 52 is disengaged, abrasion powder collected in the recessed storage 1c can be removed.

[0054] The lower inside bearing 41 may be a bearing with seal while a bearing without seal is used as the lower outside bearing 42, alternatively as illustrated in Fig. 6 (a), both the bearings 41 and 42 may be bearings which have no seals while bores 4a for the abrasion powder passage are formed in the carrier 4, so that abrasion powder moves to recessed storage 1c without damaging oil seal 51. Furthermore, as illustrated in Fig. 6(b), bores 4a for abrasion powder passages may be formed in the carrier 4 while bearing with seal is used as the lower

inside bearing 41 while the lower outside bearing 42 is a bearing without seal, and alternatively, as illustrated in Fig. 6 (c), both the bearings 41 and 42 are bearings with seal.

[0055] In the present embodiment, rotation of the output shaft 1a of drive motor 1 is transmitted to the externally contacting shaft 5 of the traction drive type reduction gear 20. In this occasion, since the internally contacting cylinder 6 is fixed to the frame 11, the rotation of the externally contacting shaft 5 is decelerated, and it is transmitted to the output shaft 23 through the intermediate shafts 2 of the traction drive type reduction gear 20 and the internally contacting cylinder 6. The rotation is transmitted to the hollow pulley 10b from the solid pulley 24 mounted on the output shaft 23 through the transmission member 25 such as a tooth belt, and the table 10 is rotated in a horizontal plane.

[0056] Because of the construction described above, a rotary drive device for a polishing table, a table for CMP (Chemical Mechanical Polishing) or a polisher is provided which generates a large output torque and high rotational speed precision, as well low vibration and low noise, which has a hollow structure, and which is lightweight and compact. In other words, provided is a rotary drive device of a polishing device having superior rotation stability and being compact compared to the conventional devices.

[0057] According to the present invention, unexpected advantages achieved that the number of throughput can be increased by means of improvement of pressure force of abrasion with increase of a rotation torque of a CMP table, and thus, productivity can be improved, and that floor space for installation can be reduced because it is so compact that it is completely stored under a table. By lightweighting, pressure to the clean room bed that has comparatively low limit against load can reduce, and low cost can be realized. Stability of superior rotation highly contributes to a uniform flattening of wafer greatly, and the performance of a CMP table drive is improved remarkably.

[0058] The traction drive type reduction device (gear) which is applicable to the present invention may be not only of a traction type wherein power is transmitted by friction force via lubricating oil but also of a friction drive type wherein power is transmitted by friction force without using lubricant, and the scope of the present invention includes both the types.

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Cancelled)
2. (Presented previously) The polishing device of claim 12, wherein said externally contacting shaft is formed in a ring-shaped hollow cylinder; and
under free conditions, the externally contacting shaft has a diameter which is a little bit larger than a diameter of an imaginary circle which externally contacts with the plurality of intermediate shafts whereby pressing load is created by means of deformation of the externally contacting shaft.
3. (Presented previously) The polishing device according to Claim 12, wherein the internally contacting cylinder is formed in co-axially arranged double hollow rings, and that an inside ring and an outside ring of the double hollow rings are coupled with each other by means of a coupling member.
4. (Presented previously) The polishing device according to Claim 12, wherein the internally contacting cylinder is coupled with the table by means of at least one of a pin or a key.
5. (Presented previously) The polishing device according to Claim 12, wherein the internally contacting cylinder is formed in an inner race of the main bearing.
6. (Presented previously) The polishing device according to Claim 5, wherein the main bearing is formed by two lines of angular ball bearings, and the outer race of the main bearing is integrated with a housing of the polishing device.
7. (Presented previously) The polishing device according to Claim 12, wherein an electric motor is coupled with the input shaft, and the input shaft is offset more greatly than a radius of the electric motor from the center of the externally contacting shaft.
8. (Presented previously) The polishing device of claim 13, wherein a carrier rotatably supports the intermediate shafts, and output is taken from the carrier.
9. (Presented previously) A polishing device comprising:
a table;
a traction drive type reduction gear driving said table, said reduction gear comprising:

a center;
an externally contacting shaft arranged at said center;
a plurality of intermediate shafts disposed equidistantly at a circumference of the externally contacting shaft, said intermediate shafts externally contacting the externally contacting shaft; and
an internally contacting cylinder with which the intermediate shafts internally contact;
said externally contacting shaft being an input shaft;
a carrier rotatably supports the intermediate shafts, and output is taken from the carrier;
and
the externally contacting shaft is offset from the rotational center of the table, and an output shaft coupled to the carrier being disposed on an axis of an externally contacting shaft, and the output shaft being coupled with the table by means of a power transmission member.

10. (Presented previously) The polishing device according to Claim 9, wherein an electric motor is coupled with the externally contacting shaft.

11. (Cancelled)

12. (Presented previously) The polishing device of claim 16, wherein at least one of the intermediate shafts is an input shaft.

13. (Presented previously) The polishing device of claim 16, wherein the externally contacting shaft is an input shaft.

14. (Presented previously) The polishing device of claim 16, wherein said polishing device is a polishing table.

15. (Presented previously) A polishing device comprising:
a table; and
a traction drive type reduction gear driving said table, said reduction gear comprising:
a center;
an externally contacting shaft arranged at said center;
a plurality of intermediate shafts disposed equidistantly at a circumference of the externally contacting shaft, said intermediate shafts externally contacting the externally contacting shaft; and
an internally contacting cylinder with which the intermediate shafts internally contact;

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said externally contacting shaft being an input shaft,
a carrier rotatably supporting the intermediate shafts, and output being taken from the internally contacting cylinder.

16. (Amended currently) A polishing device comprising:
a table provided with hollow space beneath the central portion of the table;
a traction drive type reduction gear driving said table; and
a driving motor coupled with the reduction gear and disposed offset from the central rotational axis of the table:

said reduction gear comprising:
a center;
an externally contacting shaft arranged at said center;
a plurality of intermediate shafts disposed equidistantly at a circumference of the externally contacting shaft, said intermediate shafts externally contacting the externally contacting shaft; and

an internally contacting cylinder with which the intermediate shafts internally contact and which is formed in a co-axially arranged ~~double~~ hollow rings.

17. (New) The polishing device of claim 16, further comprising an output shaft, wherein the internally contacting cylinder and the output shaft form co-axially arranged double hollow rings.